

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(Attorney Docket No. 4492P1003US; Client No. P96-0010US4)

Applicant: Bleck, Martin C. et al

For: ELECTRODE SEMICONDUCTOR WORKPIECE HOLDER AND
PROCESSING METHODS

Serial No.: Unassigned

Filed: March 16, 2001

Examiner: Unassigned

Art Unit: Unassigned

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the present application in the following manner prior to substantive examination thereof.

IN THE SPECIFICATION:

On page 1, insert before line 1 -- This application is a continuation of USSN 09/300,610, filed April 27, 1999, which is a continuation of USSN 08/680,057, filed July 15, 1996. --

IN THE CLAIMS:

Please cancel claims 1-7 without prejudice and at the following as new claims 8-15.

8. A workpiece processing method comprising:

positioning an electrode against a workpiece surface, said electrode having an electrode tip

having a sheath, said sheath having a sheath tip rim;

engaging said workpiece surface with said sheath tip rim to thereby cause the sheath tip rim to splay outwardly upon said contacting to form a continuous seal about the periphery of said electrode tip;

with said electrode tip electrically engaging said workpiece, imparting a desired electrical bias to said workpiece; and

exposing said electrically biased workpiece to desired processing conditions.

9. The workpiece processing method of claim 8 further comprising supporting said workpiece in a position adjacent said sheathed electrode.

10. The workpiece processing method of claim 8 wherein said positioning step comprises:

moving said electrode along a first motion axis away from a disengaged position; and

moving said electrode along a second motion axis that is different from said first motion axis toward an engaged position .

11. The workpiece processing method of claim 8 wherein said positioning step comprises:

longitudinally moving said electrode along a longitudinal movement axis away from a disengaged position in which said workpiece surface is not engaged by said electrode tip;

and

rotating said electrode about said longitudinal movement axis toward an engaged position in which said electrode tip is placed in electrical contact with said workpiece surface.

12. The workpiece processing method of claim 8 wherein said positioning step comprises:
moving said electrode along a first motion axis away from a disengaged position;
moving said electrode along a second motion axis toward an engaged position, said second
motion axis being different from said first motion axis;
said engaging step comprising advancing said electrode tip from a retracted position within the
sheath to an unretracted position in which said workpiece surface is physically engaged
by the electrode tip.

13. The workpiece processing method of claim 8 wherein said positioning step comprises:
longitudinally moving said sheathed electrode along a longitudinal movement axis away from a
disengaged position in which said workpiece surface is not engaged by said electrode tip;
rotating said electrode about said longitudinal movement axis and toward an engaged position in
which said electrode tip may engage said workpiece surface; and
said engaging step comprising advancing said electrode tip from a retracted position within the
sheath to an unretracted position in which said workpiece surface is physically engaged
by the electrode tip.

14. A process for electroplating a metal onto the surface of a workpiece comprising:
placing the workpiece upon a processing head including an electrode contact assembly, the
electrode contact assembly comprising at least one electrode contact having a contact tip
and at least one sealing member disposed proximate the contact tip of the at least one
electrode contact, the at least one sealing member including a resilient rim;

driving the electrode contact assembly into engagement with the workpiece to place the at least one electrode contact into electrical engagement with the workpiece, the at least one sealing rim splaying away from the contact tip of the at least one electrode contact to thereby form a continuous seal against a surface of the workpiece;

placing the workpiece into contact with an electrolyte;

providing electrical power to the at least one contact and an anode disposed in electrical contact with the electrolyte to thereby electroplate the metal on the workpiece.

15. A process for electroplating a metal onto the surface of a workpiece comprising:

placing the workpiece upon a processing head including an electrode contact assembly, the electrode contact assembly comprising a plurality of electrode contacts each having a contact tip and a plurality of sealing members respectively associated with an proximate each of the contact tips, each of the plurality of sealing members including a respective resilient rim;

driving the electrode contact assembly into engagement with the workpiece to place the plurality of electrode contacts into electrical engagement with the workpiece, the sealing rims splaying radially outward from each respective contact tip to thereby form a continuous seal against a surface of the workpiece around the respective contact tip;

placing the workpiece into contact with an electrolyte;

providing electrical power to the at least one contact and an anode disposed in electrical contact with the electrolyte to thereby electroplate the metal on the workpiece.

REMARKS

This application is a continuation of USSN 09/300,610, filed April 27, 1999. Another continuation from the '610 application is USSN 09/388,001, filed September 1, 1999. The '001 application was declared to be abandoned in a Notice of Abandonment dated November 21, 2000. In declaring the application abandoned, the Examiner found that there was an insufficient showing that an office action dated March 28, 2000, had been answered. Accordingly, the present application substantially repeats the claims and arguments presented in response to the office action in the '001 application.

In the Office Action dated March 28, 2000, the Examiner applied Cancelleri et al., USP 4,191,729, either alone or in various combinations with Yee et al, USP 3,940,502 or Fatheree, USP 5,013,015, to reject some of the claims of the application. However, many of the claims were deemed to be directed to allowable subject matter. With respect to the allowable claims, the Examiner stated that

"The prior art of record does not suggest semiconductor workpiece processing methods using a yieldable sheath tip which includes a sheath tip rim which splays outwardly upon contacting the workpiece to form a continuous seal".

All of the foregoing claims include the general substance of the subject matter that the Examiner deemed allowable. The claims set forth above further include language that is directed to clarifying amendments that were made to corresponding claims in the '001 application in response to the March 28 office action. The clarifying amendments include the removal of the term "semiconductor", so that the term "workpiece" is consistent throughout the claims. Additionally, the various elements of the electrode and sheath, as well as the interrelationship between them, have

been more clearly set forth as a result of the amendment.

Independent claims 14 and 15 do not directly correspond to any of the claims that were pending in the '001 application. Applicants submit that these claims are likewise allowable over the art of record, taken singly or in combination. Each of these claims includes a sealing member that includes a sealing rim that splays to form a seal that protects an electrode tip that is in electrical contact with a surface of the workpiece. The basic claim elements that distinguish the present invention over the art of record are therefore included in each of these additional claims.

For the foregoing reasons, applicants submit that the present application is in condition for allowance. If the Examiner feels that any further details need to be addressed, he is encouraged to contact Bob Polit at (630) 799-8335 to discuss them.

Respectfully submitted,

BY



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